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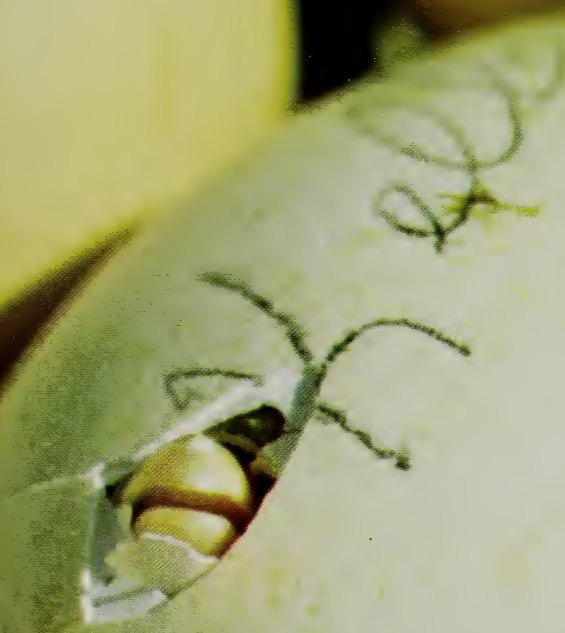


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# OTIC NEWCASTLE DISEASE

A New Form of  
a Familiar  
Poultry Disease





# **EXOTIC NEWCASTLE DISEASE**

## **A New Form of a Familiar Poultry Disease**

Exotic Newcastle disease is a contagious and deadly virus disease affecting all species of birds. The virus causes bleeding in the intestines and reproductive organs, along with severe diarrhea. It kills many of the birds it infects and cuts production and shortens the lives of the birds it doesn't destroy.

There are different forms of Newcastle disease—ranging from mild to highly virulent. The milder forms of the disease, common in poultry in this country since the 1940's, have been controlled with vaccines.

The more virulent exotic Newcastle virus causes losses even in vaccinated poultry and a death rate approaching 100 percent in unvaccinated flocks. Birds kept in confinement, such as commercially raised chickens and turkeys, are highly vulnerable. Young birds are particularly susceptible.

Exotic Newcastle disease is not a hazard to consumers of eggs and poultry products.

## **WHERE IT OCCURS**

Exotic Newcastle was first diagnosed in 1926 in Indonesia, and later that year an isolated outbreak occurred on a British farm near Newcastle-on-Tyne—from which the disease gets its name. It spread throughout Asia and reached East Africa and southern Europe during the next 15 years.

Less virulent forms of the disease also spread throughout the world in the 1930's and early 1940's. These milder forms were first identified in the United States in 1944, but scientists believe they may have been here as early as 1935.

By 1960, much of the Newcastle disease appearing in most of the world's poultry areas appeared to be the milder forms. The virulent exotic Newcastle disease was still present, however, and by the mid-1960's it was again on the move, spreading through much of Asia, the Middle East, Europe and Latin America.

The first case of exotic Newcastle disease in the United States—introduced by partridges (chukkers) and pheasants imported from Hong Kong—dates back to 1950. Other isolated cases occurred in imported pet birds in 1970 and 1971; but in each instance the disease was quickly eliminated.

The disease first struck commercial poultry flocks in April 1971, when it was diagnosed in an isolated market area near Las Cruces, N.M., and El Paso, Tex.

In November 1971, a shipment of infected pet birds from Latin America and the Orient introduced the disease into the poultry-rich San Bernardino Valley of southern California, causing a serious outbreak. Smaller outbreaks have occurred also in Florida and Arizona. The disease is apparently widespread throughout Puerto Rico.

## **THE DIFFERENT FORMS OF NEWCASTLE DISEASE**

Technically, exotic Newcastle is known as the “viscerotropic, velogenic” form of the virus disease—that is, it attacks the viscera, or internal organs, and it kills birds rapidly. Young chickens are particularly vulnerable.

As differentiated from exotic Newcastle disease, domestic Newcastle is caused by the “velogenic”, “mesogenic” or the “lentogenic” strains of the disease virus. The velogenic form is usually an acute infection in chickens and turkeys of all ages, affecting the respiratory tract and nervous system. It can produce heavy death losses, but unlike exotic Newcastle it does not produce hemorrhages.

The mesogenic form is a less acute respiratory-nervous infection. It is sometimes lethal in young chickens, but rarely kills older birds.

The lentogenic form is a mild respiratory infection which rarely causes death in birds of any age. It is used in making some Newcastle vaccines.

Both the vologenic and mesogenic forms decrease egg production in laying flocks and retard the growth rate of broiler chickens and roasting turkeys.

The signs of domestic Newcastle disease include:

- Difficult breathing and gasping
- Inactivity and weakness
- Nervous disturbances: head tremor, twisted neck, and paralysis of the wings or legs.

With domestic Newcastle disease, paralysis occurs more frequently in chicks and broilers than in layers. Death rates from domestic Newcastle are much lower in laying flocks than in laying flocks infected with the exotic form. The signs of domestic Newcastle disease in turkeys are similar to those in chickens, but generally are less severe.

A laboratory examination is needed to diagnose Newcastle disease and to differentiate the exotic form from the domestic. This involves a post mortem examination of the birds, followed by laboratory tests to isolate and identify the virus.

## **SIGNS OF EXOTIC NEWCASTLE DISEASE**

Chickens infected with exotic Newcastle disease sometimes die before definite signs of the disease appear. Often the birds first appear listless, with heavy breathing. They become progressively weak. The birds commonly have watery, greenish diarrhea, which sometimes is bloodstained. Death can occur any time after the first symptoms of depression appear.

Swelling of the head, and sometimes the wattles, is another sign of exotic Newcastle disease. Birds often appear to have "blackeyes" and a sticky fluid drains from the eyes and nose.

One of the first signs of exotic Newcastle disease in laying flocks is a sudden drop in egg production. Some birds quit laying altogether, while others suffer sharply reduced production.

Sick birds will produce malformed eggs and defective egg shells. In some cases the disease may cause a hen's oviduct to rupture, producing infection. Egg yolks are flabby, bloodspotted and generally of poor quality.

A long list of other poultry diseases can be confused with exotic Newcastle disease. These include laryngotracheitis, aflatoxin poisoning, acute pasteur-  
ellosis, trichomoniasis, candidiasis, coccidiosis,



enterohepatitis, fowl plague and even vitamin A deficiency.

The most evident signs of exotic Newcastle disease are internal. Therefore, post mortem examination, along with other laboratory tests, usually are needed to make a diagnosis.

Unlike the domestic forms of Newcastle disease the exotic virus has a significant effect on the internal organs. Although the most noticeable signs are in the intestinal tract, the heart, liver and kidneys are also affected by the virus.

Exotic Newcastle disease produces ulcers, inflammation and hemorrhage in the esophagus and proventriculus. The entire intestinal tract often is marked by ulceration, hemorrhage and inflammation.

## **SPREAD**

The primary way the disease spreads is by direct contact between healthy birds and the body discharges of infected birds. The virus is contained in the droppings of infected birds as well as in secretions from the nose, mouth and eyes.

In the close confines of a poultry raising or egg laying operation, the disease spreads rapidly.

Because high concentrations of the virus are contained in the droppings and other body discharges, the disease easily can be spread by mechanical means. The virus can survive for several weeks in such materials as feathers, poultry manure and broken eggs.

Virus-bearing material can be picked up on shoes and clothing and carried from an infected flock to a healthy one. Thus, the disease is often spread by vaccination and debeaking crews, manure haulers, rendering truck drivers, feed deliverymen, cull hen buyers, egg routemen and even by poultry farm owners and employees.

## **SUSCEPTIBLE SPECIES**

All species of birds are susceptible to exotic Newcastle disease. However, losses are greater in certain species than in others. Also, birds raised in confinement are much more likely to contract the disease because of the heightened potential for spread.



Chickens and turkeys are highly susceptible. Pheasants and pigeons also are very susceptible, especially if they are pen-raised or kept in a loft.

Wildlife studies, done at the time of the California outbreak, indicate that exotic Newcastle disease has not become established in free flying wild birds in this country. The studies also show that wild birds have not been involved in spreading the disease. Samplings of more than 6,000 wild birds captured in or around infected farms showed an infection rate of less than 0.1 percent.

Despite this low incidence of the disease in wild birds, poultrymen should protect their flocks from wild birds which might try to nest in poultry houses or feed with domesticated birds.

## **VACCINATION**

Effective protection against domestic Newcastle disease is available when USDA-approved vaccines are used properly.

Vaccination for exotic Newcastle disease has both advantages and disadvantages. Treating poultry flocks for exotic Newcastle disease with the vaccines used against domestic Newcastle will:

- Protect most of the adult flocks from death in an exotic Newcastle disease outbreak.
- Reduce the illness in an infected flock.
- Lessen the effects of the virus on egg production and quality.
- Reduce the amount of virus produced, thus decreasing the chance for the disease to spread—a very important factor in any effort to eradicate the disease.

Despite these benefits of a well-vaccinated flock, there are serious disadvantages. Vaccination will not:

- Protect a flock against infection. Once the virus is introduced, a flock becomes a virus factory—producing more and more virus that can infect other flocks.
- Give 100 percent protection. No matter how good the vaccine or vaccination program, some birds will die (in some cases up to 20 percent



1. Note the swelling around the eyes in both birds—the one on the left shows evidence of bleeding from the nose. Edema of the head may be caused by exotic Newcastle disease.

2. Here necrotic areas (yellow spots) can be seen on the roof of the mouth of an exotic Newcastle-infected chicken.

3. The hemorrhages and swelling in the esophagus wall of this bird are evidence of exotic Newcastle disease infection.

4. Exotic Newcastle disease may also cause hemorrhages at the junction of the esophagus and proventriculus.

5. Exotic Newcastle does costly damage to the reproductive organs. Infection in the reproductive system of a laying hen is evidenced by the broken egg in the abdominal cavity.

6. Necrotic patches (yellow spots), surrounded by inflamed tissue in the



intestinal wall are a significant sign of exotic Newcastle disease.

7. Note the necrotic areas in the wall of the opened intestine (top) and the partially opened intestine (bottom). This kind of intestinal involvement is an important sign of exotic Newcastle disease.



death losses have been recorded in vaccinated layer flocks); there will be some reduction in egg output and egg quality will suffer (in most cases egg quality has dropped by 15 percent).

- Protect young birds adequately. During the first three to five weeks of life, the antibodies that young birds have acquired from their vaccinated parents interfere with the effectiveness of the vaccine.

Vaccination has other drawbacks. It often produces undesirable side effects, including a decline in egg production. In meat birds, vaccine cannot be used within two weeks of slaughter. To provide even some protection against exotic Newcastle disease, birds must be revaccinated and this increases production costs. In an eradication program, vaccine can mask the signs of exotic Newcastle and thus allow infection to go undetected.

## **CONTROL AND ERADICATION**

USDA policy on foreign animal diseases has two goals: (1) keep them out of the country; and (2) if introduced, eradicate them.

The first exotic Newcastle disease outbreak in a major U.S. poultry-producing area started in November 1971, in southern California. Despite State and Federal efforts to contain the disease, it continued to spread—not only threatening southern California's poultry industry, but also the entire U.S. poultry and egg supply. In March 1971, a national animal health emergency was declared and an all-out eradication campaign was begun.

A special State-Federal task force was organized, with headquarters in Riverside, Calif. The quarantine was expanded to include California's eight southern counties.

Infected and exposed flocks were destroyed to eliminate sources of the virus. Premises were thoroughly cleaned and disinfected and then left vacant for 30 days.

Other eradication measures included vaccination of poultry—to help slow the spread of the disease. The use of vaccine, however, masked signs of the disease and thus made it more difficult to detect.



The task force used three main tools to help locate infection:

(1) Sentinel birds—chickens highly susceptible to exotic Newcastle disease—were placed in all commercial flocks and a representative number of backyard flocks in the outbreak area. If the sentinels sickened or died, they were examined in the laboratory to determine whether exotic Newcastle virus was present.

(2) Regular collections were made of dead poultry from commercial egg ranches. These poultry were examined in the laboratory for signs of the disease.

(3) Egg production records were checked and flocks were observed for symptoms. If problems developed, birds were examined at the laboratory to determine if exotic Newcastle disease was present.

In the two years of the eradication operations, the task force succeeded in reducing the quarantine area in southern California from 45,000 square miles to 0. During the same period, 1,307 infected and exposed flocks were located, and about 11½ million infected and exposed birds—primarily laying hens—were destroyed. Cost of the operation was approximately \$50 million. In contrast, if the disease had been allowed to spread throughout the nation, yearly losses to the poultry industry were estimated at \$230 million or more.

## **PREVENTING REINFECTION**

USDA regulates the importation of live poultry, pet birds and poultry meat and eggs in an effort to prevent introduction of exotic Newcastle disease into the United States.

USDA's Agricultural Research Service is involved in ongoing research aimed at developing new scientific tools for fighting exotic Newcastle disease.

In addition to these efforts, APHIS has specially trained foreign animal disease diagnosticians stationed around the Nation to rapidly identify any suspicious disease outbreak.

Poultry breeding organizations across the country are working with APHIS and their own veterinarians to fight exotic Newcastle, and other poultry health problems, through disease prevention programs.

Prepared to move in on any future exotic Newcastle disease outbreak is the APHIS Emergency Programs organization. This group of disease eradication experts is set up to take immediate action to eliminate an exotic Newcastle disease outbreak.

## **WHAT POULTRY OWNERS CAN DO**

Watch for disease signs in your flock. Report—immediately—any suspicious symptoms or unexplained death losses to your veterinarian, your county agricultural agent or to State or Federal animal health officials.

Send birds that die unexpectedly to a diagnostic laboratory for examination.

If an exotic Newcastle disease outbreak occurs, observe all quarantine requirements and cooperate with State and Federal animal health officials.

Keep your cages and poultry houses clean. Remove manure regularly. Control wild birds, insects and rodents.

Avoid overcrowding your birds; eliminate all the stress-producing factors you can.

Get replacement birds from a reliable source.

Avoid visiting other poultry farms. If you do go on other farms where there are poultry, be sure to clean and disinfect your shoes and change your clothing before coming into contact with your own flock.

Your employees should be discouraged from keeping poultry of their own and from visiting other poultry farms. They should be encouraged to follow sound disease-prevention practices, including the use of protective clothing and rubber boots that can be laundered or disinfected.

Visitors to your poultry operation should be kept from coming in contact with your birds. Service crews, deliverymen and salesmen, who must visit your flocks should follow disease-prevention precautions including the use of disinfectant on their footwear, vehicles and equipment.

If you raise broilers or turkeys, separate the breeding operations from growing facilities.

If you have an egg-laying operation, isolate replacement brooding and growing birds from your production houses. If possible run your operation on an "all-in, all-out" basis with a single-age flock. After the hens go out of production, clean and disinfect the farm before you bring in replacements. If you must have a multi-age flock, clean and disinfect when an age group is replaced. Separate any egg sales area on the farm from the production area. This will help prevent egg customers from introducing disease.

Don't re-use egg flats, fillers, cartons or cases unless they are made of plastic or some other material that can be cleaned and disinfected repeatedly. Dirty egg flats from an infected farm can spread exotic Newcastle disease if they are returned to an uninfected farm.



This is one of a series of publications to help acquaint American livestock and poultry producers with foreign animal diseases. If you want more information, contact State or Federal animal health officials in your area.



## IMPORTANT NOTE

*Exotic Newcastle disease is not dangerous  
to consumers of eggs and poultry meat.*

*However, some persons working directly*

*with diseased birds in an infected flock*

*or with vaccines used against domestic*

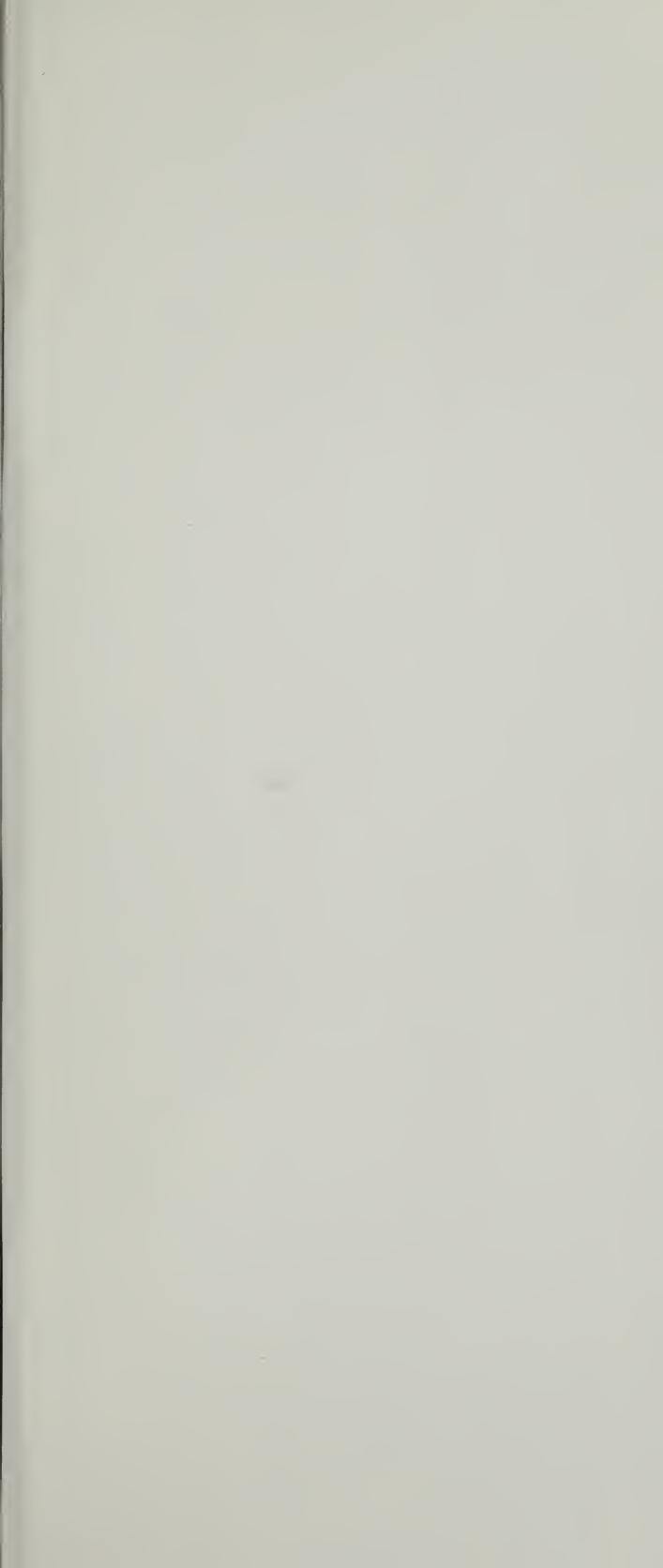
*Newcastle disease may develop a slight*

*eye infection. This should be treated*

*promptly by a physician.*

Veterinary Services  
Animal and Plant Health Inspection Service

March 1975





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